Examples of suitable types of springs and spring mechanisms are described in U.S. Provisional Application No. 61/143,203 incorporated by reference above.

[0038] Any suitable type of materials can be utilized to provide components of the material assembly **200**.

[0039] For example, in at least some embodiments, substrates **208**, **210** can be formed from a clear material such as plastic or glass. Additionally, the conductive layers of material **212**, **214** can comprise any suitable type of conductive material. Alternately or additionally, the substrates may comprise material with conductive properties. For example, in at least some embodiments, at least one of the substrates can be formed from a conductive material such as sheet metal. Other materials can, of course, be utilized without departing from the spirit and scope of the claimed subject matter.

[0040] In at least some embodiments, the conductive material is a clear conductive material. Alternately or additionally, in at least some embodiments, the conductive material is a spray-on material or film that is applied, coated or otherwise deposited (as through any of a variety of deposition techniques such as, by way of example and not limitation, CVD, PECVD, and the like) onto the surfaces of substrates **208**, **210**. Alternately or additionally, in at least some embodiments, the conductive material can comprise indium tin oxide, silver, copper, or any other suitable type of conductive material.

[0041] Dielectric material **216** can comprise any suitable type of dielectric material such as, by way of example and not limitation, air, glass, plastic, elastomeric material, gels and/or other fluidic or non-fluidic materials.

[0042] In one or more embodiments, various parameters associated with the material assembly **200** can be selected in order to provide desired operating characteristics. For example, parameters associated with the dimension of air gap **218** and the dielectric constant of dielectric material **216** can be selected in order to provide desired operating characteristics. In at least some embodiments, the following parameter values can be used:

Parameter	Value
Air gap dimension	0.1 to 1.0 mm
Dielectric constant	Greater than or equal to 1

[0043] Having considered an example material assembly, consider now example components that can be used in connection with the material assembly to provide a user with tactile feedback.

[0044] Example Components

[0045] FIG. **3** illustrates some example components in accordance with one or more embodiments generally at **300**. Components **300** include a touch sense module **302**, a drive module **304**, and an actuator mechanism **306**. Actuator mechanism **306** corresponds, in this example, to actuator mechanism **206** in FIG. **2**. Any suitable hardware, software, and/or firmware can be used to implement touch sense module **302** and drive module **304**.

[0046] With respect to touch sense module **302**, any suitable type of technology can be utilized to implement the touch sense module such that it is capable of sensing when a user has touched or otherwise engaged the touch screen. Examples of suitable, known technologies include, by way of example and not limitation, capacitive field technology, resistive technology, optical, field effect, force/pressure, inductive, Hall effect, and the like.

[0047] Drive module **304** includes drive circuitry operably connected to the spaced-apart substrates of actuator mechanism **306**. The drive circuitry is configured to drive the conductive layers of material with an electrical signal responsive to an input such as, by way of example and not limitation, sensing a touch input, software events, and/or other triggers or occurrences such as those mentioned above. Driving the conductive layers causes one or more of the corresponding substrates to be moved either or both of towards one another or away from one another. In some embodiments, the drive circuitry can use different drive profiles to drive the conductive layers to, in at least some embodiments, provide various tactile feedback to the user. The drive profiles can include, by way of example and not limitation, a series of voltage pulses having various frequencies,

[0048] As an example of suitable drive circuitry, consider FIGS. **4***a*-**4***f*.

[0049] FIG. **4***a* illustrates a high-level block diagram of an example system, generally at **600**, that can be incorporated into a keyboard or similar device and utilized to implement the functionality described above and below. In the illustrated and described example, system **600** includes a microcontroller **602** which, in turn, includes a haptics customizing engine **604**, a computer-readable storage media in the form of an EEPROM **606**, a keyboard component **608**, a key scanning component **610**, and a haptics engine **612**. In addition, system **600** includes an adjustable DC/DC converter **614**, high side switches **616**, **618**, low side switches **620**, **622**, and an actuator **624**.

[0050] In addition, a switch is illustrated generally at **630** and represents aspects of a touch surface that is configured to detect a user's engagement. Detection of a user's engagement can occur using any suitable type of sensor or detection apparatus. For example, in at least some embodiments, a mechanical switch, membrane switch, a capacitive-type sensor or a projected field-type sensor, surface acoustic wave, infrared display, optical/imaging resolution, and/or image sensing can be employed to sense a user's engagement. The operating principles of these types of sensors are generally known and, for the sake of brevity, are not described in detail here other than the explanation that appears just below.

[0051] In at least some embodiments, the detection apparatus establishes a sensory field that overlays a portion or all of a touch surface effective to define a sensor layer. The sensor layer can be considered as a region in which the presence and/or movement of a user, such as a user's finger, can be detected by the sensor layer. When the user's presence and/or movement is sensed by the sensor layer, an electrical signal can be sent to the drive electronics to effectively drive the substrates to cause the touch surface to move in a desired fashion.

[0052] As shown, haptics customizing engine **604** is connected to the adjustable DC/DC converter **614** which, in turn, is connected to high side and low side switches **616**, **618** and **620**, **622** respectively. Actuator **624** is operably connected to the high side and low side switches as shown. The switches, both high side and low side are connected to haptics engine **612**.

[0053] In operation, in one or more embodiments, haptics customizing engine **604** is configured to load predefined haptic profiles from EEPROM **606** or modify parameters of exist-